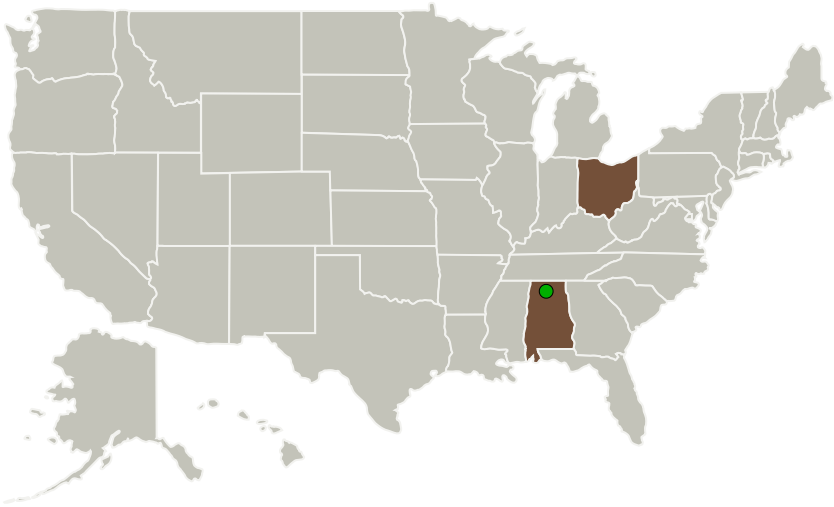
Self-Deploying, Composite Habitats, Phase II

Completed Technology Project (2011 - 2013)

Project Introduction

Cornerstone Research Group, Inc. (CRG), proposes to develop self-deploying, composite structures for lunar habitats, based on CRG's Veritex(TM) materials. These structures will provide a rigid, durable habitat that will reduce the risk of mechanical failure due to crew or environmentally induced damage compared with inflatable structures that are more susceptible to punctures and damage from micrometeoroid impacts. Veritex is a composite material consisting of common reinforcement fibers, such as e-glass, carbon, Kevlar(R), or high-strain capable fabrics, and one of CRG's shape memory polymers (SMP). Veritex materials will return to a memorized shape when raised above a specific activation temperature. This unique feature enables the use of Veritex(TM) as a primary lunar structure for its predictability and repeatability, which will offer quick, self-deploying lunar habitat that can return to a rigid enclosure after the deployment process. The development of expanding composite habitats will offer increased packing efficiency compared with fully rigid structures that lack expandable characteristics and waste valuable cargo space. This habitation structures technology will achieved Technology Readiness Level (TRL) 4 during Phase 1 with proof-of-concept feasibility studies and will achieve a TRL of 5 during Phase II.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Cornerstone Research Group, Inc.	Lead Organization	Industry	Miamisburg, Ohio
Marshall Space Flight Center(MSFC)	Supporting Organization	NASA Center	Huntsville, Alabama

Primary U.S. Work Locations	
Alabama	Ohio

Project Transitions

June 2011: Project Start

June 2013: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/139313)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Cornerstone Research Group, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Jason Hermiller

Co-Investigator:

Jason Hermiller

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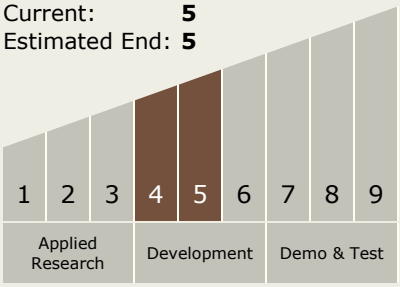
Technology Maturity (TRL)

Start: **4**
Current: **5**
Estimated End: **5**



Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - TX12.2 Structures
    - TX12.2.1 Lightweight Concepts

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System